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EXAMINER	
THOMPSON, JAMES A	

ART UNIT	PAPER NUMBER
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/902,760	MATSUOKA, HIROCHIKA	
	Examiner	Art Unit	
	JAMES A. THOMPSON	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 25 January 2008 has been entered.

Response to Arguments

2. Applicant's arguments filed 25 January 2008 have been fully considered but they are not persuasive. Firstly, Examiner agrees with Applicant that the present amendments to the claims overcome the prior art rejections set forth in the previous office action, mailed 25 January 2008. However, the combination of Ng (USPN 5,185,661) and the previously cited reference Lin (USPN 6,421,142 B1), when combined with as shown in the prior art rejections set forth below, demonstrates that the presently recited claims would have been obvious to one of ordinary skill in the art at the time of the invention. Thus, Applicant's present arguments and amendments are fully addressed by the new grounds of rejection set forth below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 12 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng (US Patent 5,185,661) in view of Lin (USPN 6,421,142 B1).**

Regarding claims 12, 16 and 17: Ng discloses an image processing apparatus (figures 9A-9B of Ng) which maps a first color gamut into a second color gamut (figure 6 and column 6, lines 17-20 of Ng), comprising: a first sample point setting unit (figure 9A(18) and column 4, lines 37-42 of Ng) adapted to

set first sample points on a surface of the first color gamut (figure 6; figure 8; and column 8, lines 4-24 of Ng – *$P_i(L_i^*,a_i^*,b_i^*)$ points which occur on the surface of the input color gamut i*) and second sample points in the first color gamut (figure 6 and column 6, lines 9-13 of Ng – *$P_i(L_i^*,a_i^*,b_i^*)$ points which occur internally in the input color gamut i*); an obtaining unit (figure 9A(20) and column 4, lines 69 to column 5, line 3 of Ng) adapted to obtain third sample points by mapping the first sample points into the second color gamut, and obtaining fourth sample points by mapping the second sample points into the second color gamut (figure 6 and column 6, lines 9-21 of Ng – *$P_o(L_i^*,a_i^*,b_i^*)$ points are mapped from both the surface input points and the internal input points; the boundary surface points of the input color space would be mapped to boundary surface points of the output color space, whether through direct mapping, expansion [in the case that output color space is larger than input color space], or compression [in the case that output color space is smaller than input color space]*); a gradation line setting unit (figure 9A (22(portion)) and column 5, lines 19-24 of Ng – *gradation line setting is portion of operations performed by tri-linear interpolation unit (22)*) adapted to set surface gradation lines based on the first sample points (figure 8(21) and column 8, lines 17-37 of Ng) and internal gradation lines based on the second sample points (figures 7b-7c; column 7, lines 25-43; and column 8, lines 37-42 of Ng); a gradation line mapping unit (figure 9B(32) and column 6, lines 42-48 of Ng) adapted to map the surface gradation lines based on the third sample points (figure 8(21) and column 8, lines 17-37 of Ng), and mapping the internal gradation lines based on the fourth sample points (figures 7b-7c; column 7, lines 25-43; and column 8, lines 37-42 of Ng); a calculating unit (figure 9A(22(portion)) and column 5, lines 19-24 of Ng – *calculating unit is portion of operations performed by tri-linear interpolation unit (22)*), for calculating a relative position of an input color to the surface gradation lines or the internal gradation lines (column 4, lines 50-64 and column 5, lines 10-24 of Ng – *position in color space used to determine (1) closest index point in lookup table and (2) relative position to closest index point, in order to determine output value [even if relative position is zero, and thus the lookup data point is used without interpolation]*); and a calculating unit (figure 9A(22(portion)) and column 5, lines 19-24 of Ng – *calculating unit is portion of operations performed by tri-linear interpolation unit (22)*), for calculating an output color from the mapped surface gradation lines or the mapped internal gradation lines, based on the relative position (column 4, lines 50-64 and column 5, lines 10-24 of Ng – *again, position in color space used to determine (1) closest index point in lookup table and (2) relative position to closest index point, in order to determine output value [even if relative position is zero, and thus the lookup data point is used without interpolation]*), wherein the surface gradation lines and the internal gradation lines each indicate a locus of color change in the first color gamut, and the mapped surface gradation lines and the mapped internal

gradation lines each indicate a locus of color change in the second color gamut (figure 6 and column 8, lines 37-42 of Ng – *Both the internal and boundary points are mapped with respect to a locus of color change (ΔH) and stored in a LUT*).

Ng does not disclose expressly setting and mapping *a plurality of independent* surface gradation lines and internal gradation lines, and calculating *a plurality of independent* mapped surface gradation lines and internal gradation lines.

Lin discloses performing color space conversion using a plurality of independent surface gradation lines (column 11, lines 43-55 of Lin) and internal gradation lines (column 18, line 65 to column 19, line 8 of Lin – *plurality of independently processed and computed patches formed and analyzed to minimize color error*).

Ng and Lin are combinable because they are from the same field of endeavor, namely color space conversion in digital image data processing systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to treat conversion areas independently of each other, as taught by Lin. Thus, by combination, Ng in view of Lin teaches setting and mapping a plurality of independent surface gradation lines and internal gradation lines, and calculating a plurality of independent mapped surface gradation lines and internal gradation lines. The motivation for doing so would have been to minimize the overall color error that occurs when converting from the color space of the input device to the color space of the output device (column 11, lines 52-55 and column 19, lines 6-8 of Lin). Therefore, it would have been obvious to combine Lin with Ng to obtain the invention as specified in claims 12, 16 and 17.

Regarding claim 18: Ng discloses that the relative position is defined by a ratio of internal division (figure 7b and column 7, lines 24-30 of Ng).

Regarding claim 19: Ng discloses that the relative position is defined by an angle ratio (figure 7c; figure 8; and column 8, lines 4-16 of Ng).

Regarding claim 20: Ng discloses setting a set consisting of a first predetermined number of first sample points on the surface of the first color gamut (figure 6; figure 8; and column 8, lines 4-24 of Ng – $P_i(L_i^*,a_i^*,b_i^*)$ *points which occur on the surface of the input color gamut i – also see column 4, line 64 to column 5, line 9 of Ng, which demonstrates that the number of sample points for the gamut is predetermined based on the characteristics of the color space; thus the number of surface sample points is predetermined*), and a set consisting of a second predetermined number of second sample points in the interior of the first color gamut (figure 6 and column 6, lines 9-13 of Ng – $P_i(L_i^*,a_i^*,b_i^*)$ *points which occur internally in the input color gamut i – also see column 4, line 64 to column 5, line 9 of Ng, which*

demonstrates that the number of sample points for the gamut is predetermined based on the characteristics of the color space), where the second predetermined number may be either equal to or different from the first predetermined number (*equal to or different from would cover all possible combinations of first predetermined number of first sample points and second predetermined number of second sample points*); obtaining third sample points corresponding to respective ones of the first sample points (figure 6 and column 6, lines 9-21 of Ng – *$P_o(L_i^*, a_i^*, b_i^*)$ points are mapped from both the surface input points and the internal input points; the boundary surface points of the input color space would be mapped to boundary surface points of the output color space, whether through direct mapping, expansion [in the case that output color space is larger than input color space], or compression [in the case that output color space is smaller than input color space]*), and fourth sample points corresponding to respective ones of the second sample points (figure 6 and column 6, lines 9-21 of Ng – *$P_o(L_i^*, a_i^*, b_i^*)$ points are mapped from both the surface input points and the internal input points; the boundary surface points of the input color space would be mapped to boundary surface points of the output color space, whether through direct mapping, expansion [in the case that output color space is larger than input color space], or compression [in the case that output color space is smaller than input color space]*), wherein the third sample points and the fourth sample points are in the second color gamut (*third and fourth sample points are within $P_o(L_i^*, a_i^*, b_i^*)$, the second (output) color gamut*), and the fourth sample points are in the interior of the second color gamut (*fourth sample points derived from second sample points, and are thus interior of the second color gamut*); setting first surface gradation lines based on the first sample points and first internal gradation lines based on the second sample points, the first surface gradation lines each lying entirely on the surface of the first color gamut (figure 8(21) and column 8, lines 17-37 of Ng – *boundary surface points of the input color space would be mapped to boundary surface points of the output color space, whether through direct mapping, expansion [in the case that output color space is larger than input color space], or compression [in the case that output color space is smaller than input color space]*) and the first internal gradation lines each containing points in the interior of the first color gamut (figures 7b-7c; column 7, lines 25-43; and column 8, lines 37-42 of Ng), wherein the first surface gradation lines and the first internal gradation lines each indicate a respective locus of color change in the first color gamut (figure 6 and column 8, lines 37-42 of Ng – *both the internal and boundary points of the first color gamut are mapped to the second color gamut with respect to a locus of color change (ΔH), and the results stored in a LUT; thus, the first surface and internal gradation lines each indicate a respective locus of color change in the first color gamut*); mapping the first surface gradation lines to second surface gradation lines that are based on the third sample points (figure 8(21) and column 8, lines 17-37 of Ng),

and mapping the first internal gradation lines to second internal gradation lines that are based on the fourth sample points and that lie in the interior of the second color gamut (figures 7b-7c; column 7, lines 25-43; and column 8, lines 37-42 of Ng), wherein the second surface gradation lines and the second internal gradation lines each indicate a respective locus of color change in the second color gamut (figure 6 and column 8, lines 37-42 of Ng – *both the internal and boundary points are mapped with respect to a locus of color change (ΔH) and stored in a LUT*); and mapping an input color into an output color in the second color gamut by using the second surface gradation lines and the second internal gradation lines (figure 6 and column 8, lines 37-42 of Ng – *both the internal and boundary points are mapped with respect to a locus of color change (ΔH) and stored in a LUT*), wherein said step of mapping the input color into the output color in the second gamut includes calculating the output color from the second surface gradation lines and the second internal gradation lines, based on the input color and its location in the first color gamut relative to at least one gradation line from among the first surface gradation lines and the first internal gradation lines (column 4, lines 50-64 and column 5, lines 10-24 of Ng – *position in color space used to determine (1) closest index point in lookup table and (2) relative position to closest index point, in order to determine output value [even if relative position is zero, and thus the lookup data point is used without interpolation]*).

Ng does not disclose expressly setting and mapping *a plurality of independent* surface gradation lines and internal gradation lines, and calculating *a plurality of independent* mapped surface gradation lines and internal gradation lines.

Lin discloses performing color space conversion using a plurality of independent surface gradation lines (column 11, lines 43-55 of Lin) and internal gradation lines (column 18, line 65 to column 19, line 8 of Lin – *plurality of independently processed and computed patches formed and analyzed to minimize color error*).

Ng and Lin are combinable because they are from the same field of endeavor, namely color space conversion in digital image data processing systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to treat conversion areas independently of each other, as taught by Lin. Thus, by combination, Ng in view of Lin teaches setting and mapping a plurality of independent surface gradation lines and internal gradation lines, and calculating a plurality of independent mapped surface gradation lines and internal gradation lines. The motivation for doing so would have been to minimize the overall color error that occurs when converting from the color space of the input device to the color space of the output device (column 11, lines 52-55 and column 19, lines 6-8 of Lin).

Therefore, it would have been obvious to combine Lin with Ng to obtain the invention as specified in claim 20.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ng (US Patent 5,185,661) in view of Lin (USPN 6,421,142 B1) and Tuijn (US Patent 6,058,207).

Regarding claim 13: Ng in view of Lin does not disclose expressly that the surface, internal, mapped surface, and mapped internal gradation lines are obtained by using at least one of a B-spline curve, a rational B-spline curve, a Bezier curve, and a one- or more-dimensional spline curve.

Tuijn discloses performing color modification in a color gamut (column 6, lines 58-67 of Tuijn) by obtaining a curve using at least one of a B-spline curve, a rational B-spline curve, a Bezier curve, and a one- or more-dimensional spline curve (column 12, lines 42-49 and column 13, lines 7-10 of Tuijn).

Ng in view of Lin is combinable with Tuijn because they are from the same field of endeavor, namely color gamut correction and modification for digital color processing systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a spline function or a Bezier function, as taught by Tuijn, to obtain the surface, internal, mapped surface, and mapped internal gradation lines taught by Ng. The motivation for doing so would have been that appropriate weight values are required to better transform color space values (column 5, lines 32-38 of Tuijn), such as in the case of the spline (column 12, line 47-52 of Tuijn) and Bezier curves (column 13, lines 7-10 of Tuijn). Therefore, it would have been obvious to combine Tuijn with Ng in view of Lin to obtain the invention as specified in claim 13.

6. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng (US Patent 5,185,661) in view of Lin (USPN 6,421,142 B1) and Berns (*Principles of Color Technology*, by Roy S. Berns, third edition, pp. 20-23 and pp. 151-164).

Regarding claim 14: Ng discloses that the first sample points are located in L*a*b* space (figure 6 and column 4, lines 37-42 of Ng).

Ng in view of Lin does not disclose expressly that the first sample points are located on six faces of an R (red) face, a G (green) face, a B (blue) face, a C (cyan) face, a M (magenta) face, and a Y (yellow) face in the first color gamut.

Berns discloses sampling color points which are located on six faces of an R (red) face, a G (green) face, a B (blue) face, a C (cyan) face, a M (magenta) face, and a Y (yellow) face in a color gamut (page 153 figure; page 154 figure; and page 155, left column, last paragraph of Berns).

Ng in view of Lin is combinable with Berns because they are from the same field of endeavor, namely color image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the RGB additive - CMY subtractive color space taught by Berns instead of the L*a*b* color space taught by Ng. The motivation for doing so would have been that RGB primary colors are the primary colors directly used for CRT displays, and CMY primary colors are the primary colors directly used for paints and printer inks (page 155, left column, last paragraph of Berns). Therefore, it would have been obvious to combine Berns with Ng in view of Lin to obtain the invention as specified in claim 14.

Regarding claim 15: Ng discloses that the mapping of the surface and internal gradation lines to the second color gamut includes mapping in an L*a*b* color space according to the first color gamut and the second color gamut (figure 6 and column 4, lines 37-42 of Ng).

Ng in view of Lin does not disclose expressly that said mapping of the surface and internal gradation lines to the second color gamut includes two-dimensional mapping on a lightness-chroma plane, and adjustment of the hue component.

Berns discloses mapping sample points to a second color gamut including two-dimensional mapping on a lightness-chroma plane (page 21, right column, last full paragraph and last two lines to page 22, left column, first two non-figure text lines; and page 21, right column, figure("Achromatic pebbles") and figure("Chromatic pebbles") of Berns), and adjustment of the hue component (page 22, left column, both figures; and page 22, right column, first paragraph under "Color Coordinates" heading).

Ng in view of Lin is combinable with Berns because they are from the same field of endeavor, namely color image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to map the surface and internal gradation lines taught by Ng onto a second color gamut, wherein said second color is a lightness-chroma-hue color gamut, and adjusting the hue, as taught by Berns. The suggestion for doing so would have been that colors can be conveniently quantified according to their lightness, chroma and hue (page 22, "Hue", "Lightness" and "Chroma" bullet points of Berns). Therefore, it would have been obvious to combine Berns with Ng in view of Lin to obtain the invention as specified in claim 15.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES A. THOMPSON whose telephone number is (571)272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward L. Coles can be reached on 571-272-7402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James A Thompson/
Examiner, Art Unit 2625

16 March 2008